GJO–2003–494–TAC

Long-Term Surveillance and Maintenance Program

2003 Annual Site Inspection and Monitoring Compliance Report for Uranium Mill Tailings Radiation Control Act Title II Disposal Sites

November 2003

Edgemont, South Dakota, Disposal Cell Site, 2003

Sherwood, Washington, Disposal Cell Site, 2003

Work Performed Under DOE Contract No. DE–AC13–02GJ79491 for the U.S. Department of Energy
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GJO−2003−494−TAC

Long-Term Surveillance and Maintenance Program

2003 Annual Site Inspection and Monitoring Compliance Report for Uranium Mill Tailings Radiation Control Act Title II Disposal Sites

Bluewater, New Mexico
Edgemont, South Dakota
Sherwood, Washington

November 2003

Prepared by
U.S. Department of Energy
Grand Junction, Colorado

Work Performed Under DOE Contract Number DE−AC13−02GJ79491
Task Order Number ST03−102

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Summary

This report presents results of annual site inspections for the three Uranium Mill Tailings Radiation Control Act (UMTRCA) Title II mill tailings sites that are currently covered by the U.S. Department of Energy (DOE) general license for long-term custody and care of uranium or thorium byproduct materials disposal sites (Title 10 *Code of Federal Regulations* Part 40.28 [10 CFR 40.28]). Specific inspection and monitoring requirements are in the Long-Term Surveillance Plan for each site.

Bluewater
The Bluewater, New Mexico, UMTRCA Title II disposal site was inspected on May 15, 2003. The site is in good condition. No ponded water was present on top of the north end of the main tailings pile during this inspection where water had been discovered during previous inspections. Evidence of unauthorized livestock grazing was observed on site but no livestock were present during the inspection. Livestock intrusion does not threaten the integrity of the disposal site but it does present a management issue for DOE. Maintenance repairs to the perimeter road and fence conducted in 2001 remain in excellent condition. The required polychlorinated biphenyl (PCB) ground water monitoring did not detect PCBs.

Edgemont
The Edgemont, South Dakota, UMTRCA Title II disposal site was inspected on June 4, 2003. The site is in good condition. No cause for follow-up inspection was identified. Ground water monitoring is not required for this site.

Sherwood
The Sherwood, Washington, UMTRCA Title II disposal site located on the Spokane Tribe of Indians reservation was inspected on August 21, 2003. The site is in good condition overall. Two items of special interest exist: (1) the classification of the reclaimed tailings impoundment as a dam and (2) the periodic ponding of water in a small area on the top of the tailings impoundment. The classification of the impoundment as a dam necessitates a dam safety inspection to assure continued compliance with the Federal Dam Safety Act. Occurrence of ponded water on top of the main tailings pile indicates slight settling of the tailings materials.

No issues were identified during the dam safety inspection. The pond area contained approximately 0.5 acre of standing water at the time of the inspection. Inspectors also noted an additional settlement area just east of the pond area. This additional area did not contain any water, however the vegetation types growing in the area indicate that saturated soils are present some of the time. Continued settlement was anticipated for the cover of this site. No evidence of settlement that would threaten the integrity of the cover was observed.

A small percentage of the riprap at the Sherwood site has crumbled. Consequently, at the recommendation of the Nuclear Regulatory Commission representative present during the 2002 inspection, plots for monitoring rock durability on portions of the dam face were established in 2003. The condition of the rock in these plots will be evaluated annually during scheduled inspections.

Ground water monitoring and piezometer water level measurements conducted in July 2003 showed all measured parameters to be within acceptable ranges.

End of current text

1.0 Bluewater

Bluewater Site Long-Term Custody Compliance Requirements

The following list comprises the long-term custody compliance requirements for the Bluewater site as defined in Section 3.2 of the site Long-Term Surveillance Plan:

1. Annual site inspection.

2. Annual inspection report.

3. Follow-up inspections and inspection reports, as necessary.

4. Site maintenance as necessary to sustain design functions.

5. Emergency measures in the event of catastrophe.

6. Environmental monitoring as required.

The Bluewater site long-term custody compliance requirements were fulfilled for 2003 as follows:

1. The site was inspected on May 15, 2003, in accordance with the inspection procedure as outlined in Section 3.3.2 of the Long-Term Surveillance Plan (LTSP).

2. This document serves as the annual inspection report.

3. No follow-up inspections were necessary.

4. No maintenance was necessary to sustain design functions.

5. No catastrophic events necessitated emergency measures.

6. The required ground water monitoring, as specified in Section 3.7.1 of the LTSP, was completed and the results are presented in this report.

Bluewater Site Inspection Results

M. P. Plessinger (Chief Inspector) and R. K. Johnson (Assistant Inspector), both of S.M. Stoller Corporation, the Technical Assistance Contractor at the DOE Grand Junction Office (GJO), conducted the inspection on May 15, 2003. The inspection was conducted in accordance with the *Long-Term Surveillance Plan for the DOE Bluewater (UMTRCA Title II) Disposal Site near Grants, New Mexico* (July 1997) and procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.28 (10 CFR 40.28).

The purposes of the inspection are to confirm the integrity of visible features at the site, to identify changes in conditions that may affect site integrity, and to determine the need, if any, for maintenance or additional inspections and monitoring.

Thirteen photographs are included in the Bluewater report. The photographs are referred to in the text of the report and on Figures 1–1 and 1–2 by photograph location (PL) numbers.

High winds occurring during the inspection were blowing a significant amount of sand and causing dust clouds (PL–1 and PL–2). Consequently the features shown in some of the photographs included in this report are less distinct than they would be under better weather conditions.

Entrance Gate, Access Road, and Access Gate

The entrance gate (at County Road 334) is a steel, double-swing stock gate. A chain and padlocks belonging to DOE and various utility companies that have rights-of-way across the site secure the gate. The access road leads from the entrance gate to the access gate. The access road is an all-weather road surfaced with crushed basalt and extends northward, along a narrow strip of DOE property, for approximately 1,700 feet to the site access gate. The access gate also is a steel, double-swing stock gate secured by padlocks keyed the same as the entrance gate. The entrance gate, access road, and access gate are in excellent condition. A significant amount of windblown sand had accumulated at the entrance gate (PL–3) and to open the gate, the inspectors had to force it through a small sand dune.

Perimeter Signs

Fifty-five perimeter or warning signs, designated P1 through P52 on Figures 1–1 and 1–2 (including perimeter signs P2A, P9A, and P9B), are posted at access points along right-of-way intersections with the site boundary and around the main and carbonate tailings disposal cells. At the Bluewater site, all signs are identical and convey the information typically conveyed on entrance signs at other Long-Term Surveillance and Maintenance (LTS&M) Program sites.

The signs are mounted about 5 feet above the ground on steel posts set in concrete. Posts for signs along the property boundary are located about 5 feet inside the actual boundary line. The remaining 42 perimeter signs are spaced about 500 feet apart around the main and carbonate tailings disposal cells about 100 feet from the toe of the cells. All signs are in good condition but the trefoil is starting to fade. The 2001 Annual Inspection Report noted that posts for perimeter signs P14, P15, and P16 are loosening, presumably from being used as rubbing posts by livestock.

Site Marker and Boundary Monuments

A granite site marker is between the southwest corner of the main tailings disposal cell and the northwest corner of the carbonate tailings disposal cell. The marker is in excellent condition.

Twenty-four boundary monuments define the site boundary. These monuments are typically inside the perimeter fence, several feet inside the true corner or boundary line. Inspectors did not rigorously inspect boundary monuments because of the blowing sand conditions. The blowing sand was actively covering many of the monuments during the inspection. All boundary monuments had been located during the baseline inspection and are expected to still exist in their correct positions.

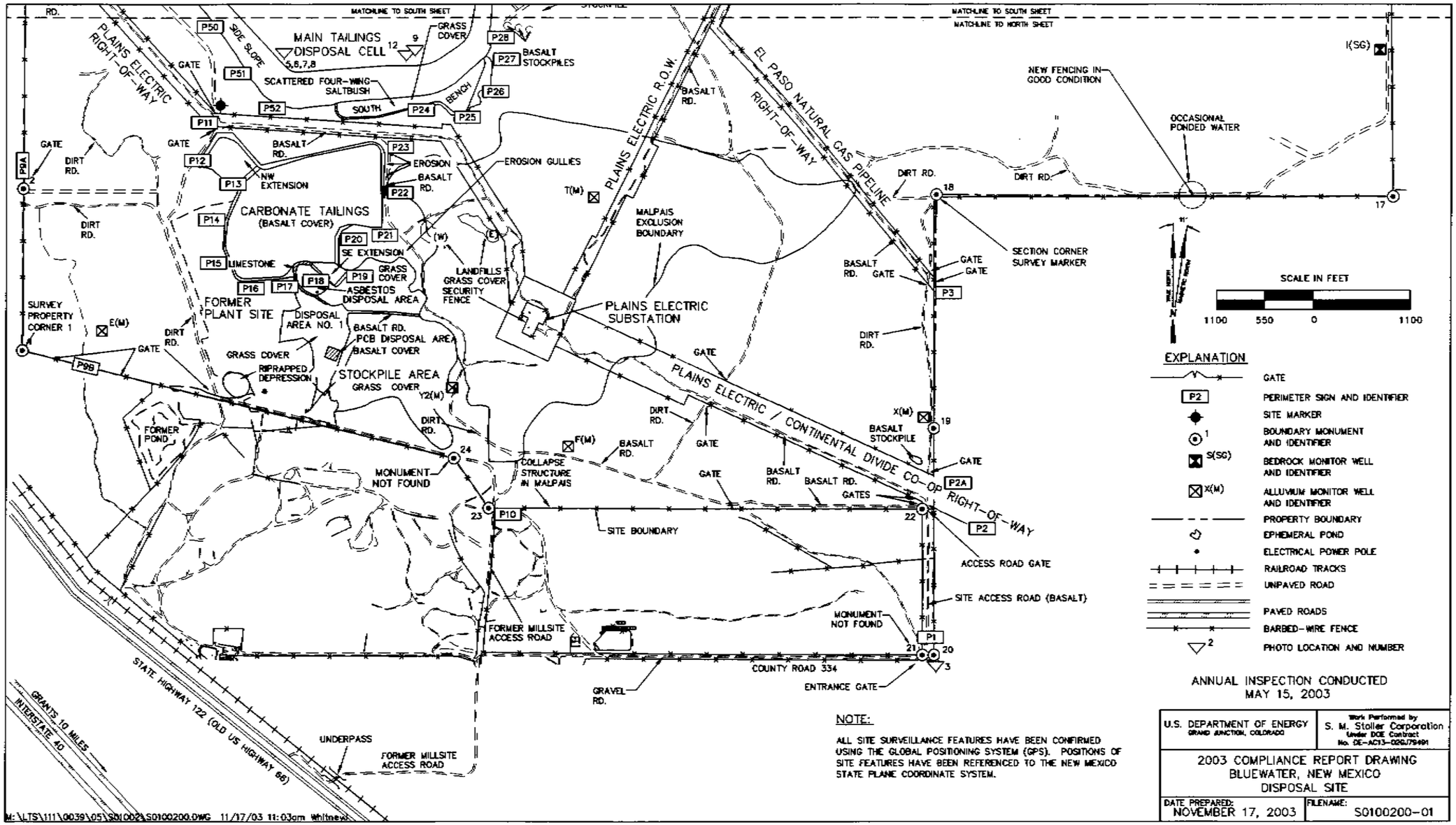


Figure 1–1. Bluewater, New Mexico, South Area, 2003

NOTE:

ALL SITE SURVEILLANCE FEATURES HAVE BEEN CONFIRMED USING THE GLOBAL POSITIONING SYSTEM (GPS). POSITIONS OF SITE FEATURES HAVE BEEN REFERENCED TO THE NEW MEXICO STATE PLANE COORDINATE SYSTEM.

TRUE NORTH
MAGNETIC NORTH

SCALE IN FEET
1100 550 0 1100

EXPLANATION

- GATE
- P1 — PERIMETER SIGN AND IDENTIFIER
- 1 — BOUNDARY MONUMENT AND IDENTIFIER
- S(SG) — BEDROCK WELL AND IDENTIFIER
- EPHEMERAL POND
- PROPERTY BOUNDARY AND FENCE
- ELECTRICAL POWER POLE
- UNPAVED ROAD
- PAVED ROADS
- BARBED-WIRE FENCE
- 2 — PHOTO LOCATION AND NUMBER

P8, P7, P6, P5, P4, P3, P2, P1, P9
WINDBLOWN SAND
1/4 CORNER SURVEY MARKER
DIRT RD.
GATES
TRANSFER BOUNDARY
FORMER HAUL ROAD
GULLY EROSION
OLD CORRAL
1/4 CORNER SURVEY MARKER
TRANSWESTERN PIPELINE 60' RIGHT-OF-WAY
PLAINS ELECTRIC R.O.W.
OPEN AREA
NO FENCES
EL PASO NATURAL GAS PIPELINE RIGHT-OF-WAY
BORROW AREA
HILLTOP
MALPAIS EXCLUSION BOUNDARY
OLD CANAL
BASALT RD.
FORMER EVAPORATION PONDS
P40, P41, P42, P43, P44, P45, P46, P47, P48, P49
P38, P37, P36, P35, P34, P33, P32, P31, P30, P29
ACID TAILINGS
GRASS COVER
POND 7
POND 6
POND 2
POND 3
POND 4
POND 5
SIDE SLOPE
POSSIBLE POND
MAIN TAILINGS DISPOSAL CELL
BASALT COVER
WINDBLOWN RED SAND DEPOSITS ON LEE SIDE OF TOP SLOPE
OBS-3
S-(SG)
L-(SG)
FENCE MATERIALS STOCKPILE
MATCHLINE TO SOUTH SHEET
MATCHLINE TO SOUTH SHEET

ANNUAL INSPECTION CONDUCTED MAY 15, 2003

U.S. DEPARTMENT OF ENERGY GRAND JUNCTION, COLORADO	Work Performed by S. M. Stoller Corporation Under DOE Contract No. DE-AC13-02GJ79491

2003 COMPLIANCE REPORT DRAWING
BLUEWATER, NEW MEXICO
DISPOSAL SITE

DATE PREPARED: NOVEMBER 17, 2003	FILENAME: S0100200-02

M:\LTS\111\0039\05\S01002\S0100200.DWG 11/17/03 11:04am WhitneyJ

Figure 1–2. Bluewater, New Mexico, North Area, 2003

Monitor Wells

There are nine monitor wells at this site. All are inside the site boundary. The five wells screened in the alluvial aquifer include the letter "M" in the well identifier: E(M), F(M), T(M), X(M), and Y2(M). The other four wells are screened in the San Andres Limestone-Glorieta Sandstone, which is the bedrock aquifer at the site. The bedrock wells are L(SG), OBS–3, S(SG), and I(SG). The aboveground structures at the wells are in fair condition.

Wells previously had dedicated pumps, flow tubes, and stock tanks to contain purge water. Protective fencing placed around each well in 2001 to mitigate livestock damage was in good condition (PL–4). Tanks were missing from E(M) and Y2(M). Surface support equipment for the monitor wells (wiring and PVC pipes) is weathered and in poor condition but does not impact sampling activities.

Main Tailings Cell, Acid Tailings, and South Bench Disposal Areas

These three disposal areas are contiguous and together constitute one large disposal area of approximately 320 acres. The main tailings disposal cell is covered with basalt riprap and slopes northward (PL–5, PL–6, PL–7, and PL–8). The top slope grade decreases from approximately 3 or 4 percent at the south end to less than 0.5 percent at the north end. The top slopes of the acid tailings (PL–9) and the south bench (PL–10) disposal areas are essentially flat and covered by grass. The side slopes of all three disposal cells are protected by basalt riprap. All three disposal cells are generally in excellent condition.

Widely scattered dead plants are present on the main tailings disposal cell, mostly on the east side slope. The plants are predominantly Russian thistle, an annual weed. Neither DOE nor the U.S. Nuclear Regulatory Commission (NRC) considers plant encroachment an issue at this site.

As noted in previous inspections, fine-grained windblown sand has been deposited for about 1,000 feet along the top of the east side slope of the main tailings pile. Mostly, the sand surface is 3 to 4 inches beneath the riprap surface, but occasionally the sand fills the riprap interstices to the top. This accumulation is insignificant at this time. Plants are not preferentially establishing in the sand. Because the climate is relatively dry and plant cover upwind from the disposal cell is sparse, sand accumulation may increase. Inspectors will continue to monitor accumulations of windblown sand here and elsewhere on site.

At the north end of the main tailings disposal cell, the top slope flattens to less than 0.5 percent. In previous years, inspectors found water ponded in depressions in this area. This year the depressions did not contain standing water.

The low spots are the result of settlement or an artifact of construction. Slimes from the settling ponds were placed in the northern part of the main tailings disposal cell and areas containing slimes are more likely to settle than areas containing drier waste materials. However, a grade of less than 0.5 percent is hard to achieve over an area as large as the north end of the main tailings disposal cell. Either mechanism could account for the depressions. One small depression that was observed for the first time during this inspection has a distinctly bowl-like shape (PL–11). This depression is most likely the result of settlement.

Inspectors will continue to monitor for ponding on top of the main tailings disposal cell. Given that evaporation greatly exceeds precipitation in this area, ponding is believed to be infrequent and brief and therefore not a significant concern. Visual observations of settlement magnitude will continue.

Carbonate Tailings Disposal Cell, Asbestos and PCB Disposal Areas, and Landfills

The top and side slopes of the carbonate tailings disposal cell are covered by basalt riprap (PL–12). The top, for the most part, slopes gently eastward. The small northwest and southeast extensions slope in their respective directions. The carbonate tailings disposal cell and its extensions are in excellent condition.

The asbestos disposal area is a bowl-like feature or depression just south of the carbonate pile. The north, west, and south side slopes of this depression are covered by limestone riprap; the bottom of the bowl is grass covered. It is in excellent condition.

The small riprap-covered polychlorinated biphenyl (PCB) disposal area is in excellent condition. The two landfills in grass-covered depressions east of the carbonate pile also are in excellent condition.

Erosion was observed along the east edge of the apron below the carbonate tailings cell during the 2001 inspection. Soil fill appeared to be washing away from the edge of the apron. This does not affect the performance of the apron at this time but inspectors should continue to monitor the area.

Other Areas Inside the Site

Other areas inside the site were inspected by driving the site perimeter road and other roads, including some utility right-of-way roads. Much of the southern and western parts of the site are inaccessible by vehicle because they are covered by basalt flows.

Several utility company rights-of-way cross the site. Stock fences with locked gates enclose these rights-of-way where they intersect one another, cross the site boundary, or cross the perimeter road.

An electric power substation is enclosed by a security fence near the center of the site along the Plains Electric Company right-of-way (Figure 1–1). Fencing around this station generally is in good condition.

Two other disposal areas, Disposal Area Number 1 and the Stockpile Area, are located south of the carbonate tailings disposal cell. Both are grass-covered and in excellent condition.

Inspectors found evidence that cattle and horses had been grazing on the site but no livestock were seen during the inspection (see below, “Site Perimeter and Outlying Areas”). Grazing is not part of the current management plan for this site.

Site Perimeter and Outlying Areas

The perimeter fence, a barbed-wire stock fence set several feet inside the property line, is generally in good condition. In 2001, fences were repaired in several locations, especially along the northwest and western boundaries. During a recent maintenance subcontractor's walkthrough, the fence was found purposefully open in several locations, presumably to allow livestock ingress and egress. A subcontractor has been retained to repair the fencing and periodically check for unauthorized livestock use of site property. If livestock are discovered on the site, the subcontractor will be authorized to remove the animals.

An area along the site boundary at the east end of the site has flooded in the past but was dry this year. A subcontractor repaired approximately 800 feet of the perimeter fence in this area in 2001. The repair remains in excellent condition and is sufficient for keeping cattle out.

The perimeter road consists of a dirt track covered at places with crushed basalt. The road runs along the site boundary in much of the southern and most of the northern and eastern parts of the site. Most of the road is in good to excellent condition, but will require periodic maintenance. In 2001, a culvert was installed where the road was washing out south of boundary monument BM–16. The repair was inspected and remains in excellent condition (PL–13).

The area outside the site boundary for one-quarter mile was visually inspected for erosion, development, change in land use, or other phenomenon that might affect the long-term integrity of the site. None was observed.

Ground Water Monitoring Results

As specified in the LTSP the only sampling required in 2003 was the U.S. Environmental Protection Agency (EPA)-required PCB sampling. The required ground water sampling was conducted on October 17, 2003. PCBs were not detected. Point of compliance (POC) well T(M) was dry and therefore not sampled.

Conclusion

The Bluewater disposal site is in good condition at this time. The occurrence of ponding near the north end of the top of the main tailings pile will continue to be monitored for impacts. EPA-required PCB sampling did not detect PCBs.

Bluewater Inspection Photographs

Table 1–1. Photograph Descriptions for Bluewater, New Mexico, Disposal Site

Photograph Location Number	Description
BLU PL–1	Blowing sand and dust, view north from north end of main tailings pile.
BLU PL–2	Blowing sand and dust, view east from north end of main tailings pile.
BLU PL–3	Entrance gate and windblown sand at County Road 334.
BLU PL–4	Monitor well L(SG) and protective fencing.
BLU PL–5	Top of main tailings pile along southwest edge.
BLU PL–6	Top of main tailings pile, view north.
BLU PL–7	Top of main tailings pile, view east-northeast; blowing dust evident.
BLU PL–8	Top of main tailings pile, view northeast; blowing dust evident.
BLU PL–9	South bench tailings area.
BLU PL–10	Cover over acid tailings.
BLU PL–11	Bowl-shaped depression on north edge of main tailings pile.
BLU PL–12	Carbonate tailings pile.
BLU PL–13	Culvert near BM–16, installed in 2001.

BLU 5/2003. PL–1. Blowing sand and dust, view north from north end of main tailings pile.

BLU 5/2003. PL–2. Blowing sand and dust, view east from north end of main tailings pile.

BLU 5/2003. PL–3. Entrance gate and windblown sand at County Road 334.

BLU 5/2003. PL–4. Monitor well L(SG) and protective fencing.

BLU 5/2003. PL–5. Top of main tailings pile along southwest edge.

BLU 5/2003. PL–6. Top of main tailings pile, view north.

BLU 5/2003. PL–7. Top of main tailings pile, view east-northeast; blowing dust evident.

BLU 5/2003. PL–8. Top of main tailings pile, view northeast; blowing dust evident.

BLU 5/2003. PL–9. South bench tailings area.

BLU 5/2003. PL–10. Cover over acid tailings.

BLU 5/2003. PL–11. Bowl shaped depression on north edge of main tailings pile.

BLU 5/2003. PL–12. Carbonate tailings pile.

BLU 5/2003. PL–13. Culvert near BM–16, installed in 2001.

End of current text

2.0 Edgemont

Edgemont Site Long-Term Custody Compliance Requirements

The following list comprises the long-term custody requirements for the Edgemont site as defined in Section 3.2 of the site Long-Term Surveillance Plan:

1. Annual site inspection.

2. Annual inspection report.

3. Follow-up inspections and inspection reports, as necessary.

4. Site maintenance as necessary to sustain design functions.

5. Emergency measures in the event of catastrophe.

6. Environmental monitoring as required.

The Edgemont site long-term custody compliance requirements were fulfilled for 2003 as follows:

1. The site was inspected on June 4, 2003, in accordance with the inspection procedure as outlined in Section 3.3.2 of the Long-Term Surveillance Plan (LTSP).

2. This document serves as the annual inspection report.

3. No follow-up inspections were necessary.

4. No maintenance was necessary to sustain design functions.

5. No catastrophic events necessitated emergency measures.

6. The condition of the grass-covered features of the site was inspected and continue to function as designed. There is no ground water monitoring required for this site.

Edgemont Site Inspection Results

The inspection was conducted on June 4, 2003, by T. G. Kirkpatrick (Chief Inspector) and M. R. Widdop (Assistant Inspector), both of S.M. Stoller Corporation, the Technical Assistance Contractor at the DOE Grand Junction Office (GJO). The inspection was conducted in accordance with (1) the Long-Term Surveillance Plan (LTSP) for this site, *Long-Term Surveillance Plan for the DOE Tennessee Valley Authority (UMTRCA Title II) Disposal Site Edgemont, South Dakota, June 1996*, and (2) procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.28 (10 CFR 40.28).

The purposes of the inspection are to confirm the integrity of visible features at the site, to identify changes in conditions that may affect site integrity, and to determine the need, if any, for maintenance or additional inspections and monitoring.

Photographs to support specific observations are identified in the text and on Figure 2–1 by photograph location (PL) numbers. Three photographs are included in this report.

Access Road, Entrance Gate Area, Fencing, and Boundary Monuments

Access to the Edgemont disposal site is immediately off an all-weather county road and is unimpaired.

The tubular metal entrance gate is secured by a padlocked chain and is in excellent condition. The site marker and site entrance sign also are in excellent condition.

A four-strand barbed-wire fence was installed in spring 1999 along the site boundary to demarcate DOE property and to control grazing on the property. The entire fence line was walked to inspect the fence and the boundary monuments. Minor fence repairs, including tightening two strands of wire on the west boundary and reattaching wire to the t-posts, were conducted during the inspection. Based on the condition of the range inside the fence on site property versus outside the fence, the fence is adequately preventing unauthorized grazing. The fence is in excellent condition (PL–1).

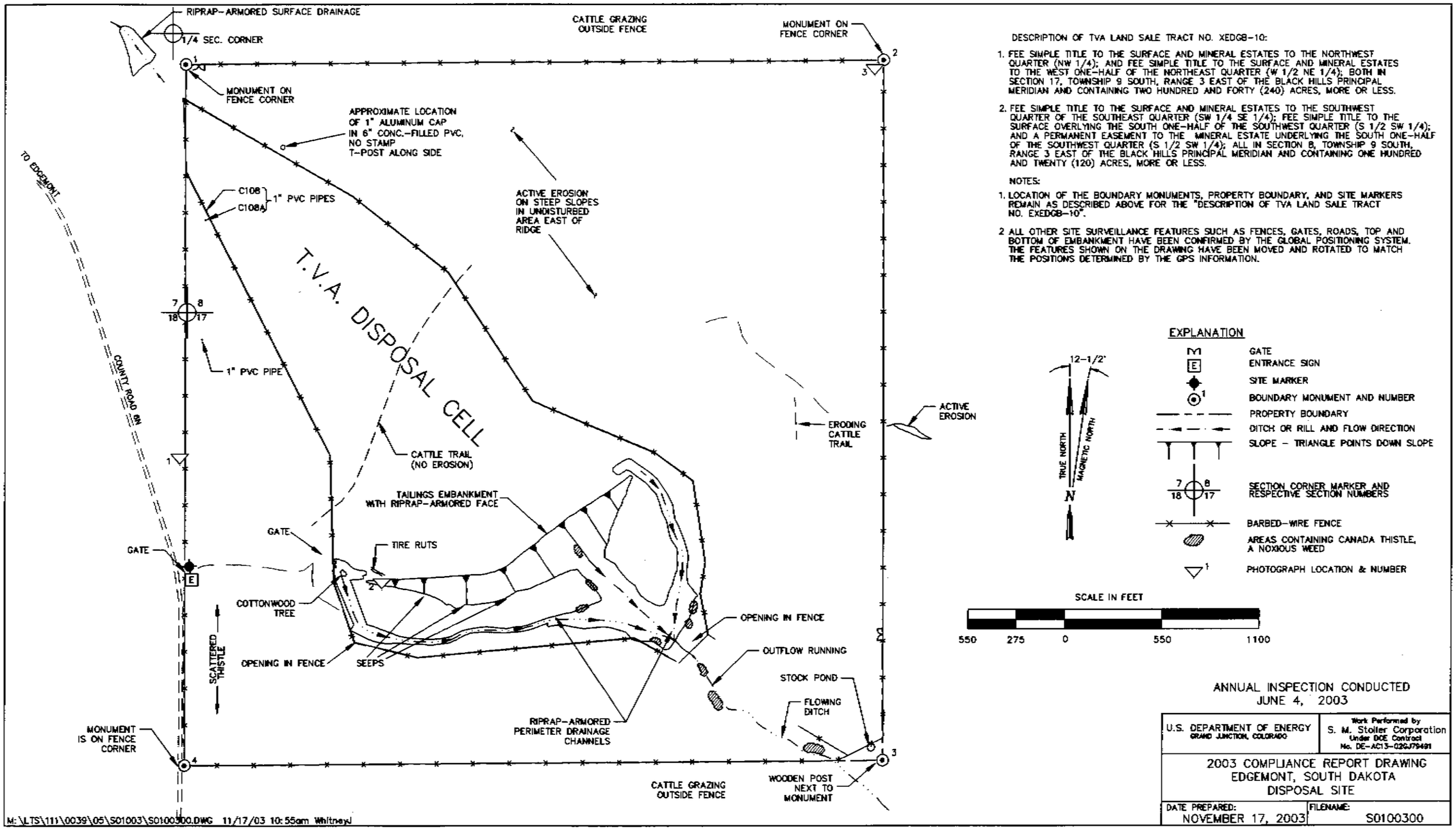
The four boundary monuments are undisturbed and in excellent condition.

Top of Disposal Cell

The 100-acre top of the disposal cell is grass-covered. DOE manages the grass cover through controlled grazing. There were no cattle on site the day of the inspection and there was no evidence of cattle grazing on the site yet in 2003. The grass is well established and was not over-grazed when inspected. Inspectors did not observe any indications of erosion, settlement, or other modifying processes on the disposal cell top. A cattle trail has developed in an east-west direction across the top of the cell. The grazing permittee stopped the cattle from traveling this trail by re-establishing the interior fence where it crosses the trail. Erosion is not currently a problem at the trail but the area should be monitored until grass is re-established.

Tailings Dam Face and Drainage and Diversion Ditches

The tailings dam face, the steepest slope on site, is covered with riprap. The slope is stable and the riprap shows no signs of degradation. Scattered plants, mostly grass, grow in the riprap (PL–2). These plants do not pose an immediate threat to stability or function of this structure. The plant density has not increased over the last few years. Plant density in the riprap dam face will continue to be evaluated during future inspections.



DESCRIPTION OF TVA LAND SALE TRACT NO. XEDGB–10:

1. FEE SIMPLE TITLE TO THE SURFACE AND MINERAL ESTATES TO THE NORTHWEST QUARTER (NW 1/4); AND FEE SIMPLE TITLE TO THE SURFACE AND MINERAL ESTATES TO THE WEST ONE–HALF OF THE NORTHEAST QUARTER (W 1/2 NE 1/4); BOTH IN SECTION 17, TOWNSHIP 9 SOUTH, RANGE 3 EAST OF THE BLACK HILLS PRINCIPAL MERIDIAN AND CONTAINING TWO HUNDRED AND FORTY (240) ACRES, MORE OR LESS.

2. FEE SIMPLE TITLE TO THE SURFACE AND MINERAL ESTATES TO THE SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER (SW 1/4 SE 1/4); FEE SIMPLE TITLE TO THE SURFACE OVERLYING THE SOUTH ONE–HALF OF THE SOUTHWEST QUARTER (S 1/2 SW 1/4); AND A PERMANENT EASEMENT TO THE MINERAL ESTATE UNDERLYING THE SOUTH ONE–HALF OF THE SOUTHWEST QUARTER (S 1/2 SW 1/4); ALL IN SECTION 8, TOWNSHIP 9 SOUTH, RANGE 3 EAST OF THE BLACK HILLS PRINCIPAL MERIDIAN AND CONTAINING ONE HUNDRED AND TWENTY (120) ACRES, MORE OR LESS.

NOTES:

1. LOCATION OF THE BOUNDARY MONUMENTS, PROPERTY BOUNDARY, AND SITE MARKERS REMAIN AS DESCRIBED ABOVE FOR THE "DESCRIPTION OF TVA LAND SALE TRACT NO. EXEDGB–10".

2 ALL OTHER SITE SURVEILLANCE FEATURES SUCH AS FENCES, GATES, ROADS, TOP AND BOTTOM OF EMBANKMENT HAVE BEEN CONFIRMED BY THE GLOBAL POSITIONING SYSTEM. THE FEATURES SHOWN ON THE DRAWING HAVE BEEN MOVED AND ROTATED TO MATCH THE POSITIONS DETERMINED BY THE GPS INFORMATION.

EXPLANATION

- GATE
- E — ENTRANCE SIGN
- SITE MARKER
- 1 — BOUNDARY MONUMENT AND NUMBER
- PROPERTY BOUNDARY
- DITCH OR RILL AND FLOW DIRECTION
- SLOPE – TRIANGLE POINTS DOWN SLOPE
- 7/18 8/17 — SECTION CORNER MARKER AND RESPECTIVE SECTION NUMBERS
- BARBED–WIRE FENCE
- AREAS CONTAINING CANADA THISTLE, A NOXIOUS WEED
- 1 — PHOTOGRAPH LOCATION & NUMBER

12–1/2°
TRUE NORTH
MAGNETIC NORTH
N

SCALE IN FEET
550 275 0 550 1100

ANNUAL INSPECTION CONDUCTED
JUNE 4, 2003

U.S. DEPARTMENT OF ENERGY GRAND JUNCTION, COLORADO	Work Performed by S. M. Stoller Corporation Under DOE Contract No. DE–AC13–02GJ79491
2003 COMPLIANCE REPORT DRAWING EDGEMONT, SOUTH DAKOTA DISPOSAL SITE	
DATE PREPARED: NOVEMBER 17, 2003	FILENAME: S0100300

Figure 2–1. Edgemont, South Dakota, 2003

Water was present in the drainage outlet below the tailings embankment during the 2003 inspection. The drainage outlet is the lowest point on site and most of the precipitation that falls on the site exits there. There was more water present in the drainage during this inspection than during the 2002 inspection, a result of greater amounts of precipitation falling on the site during the spring and early summer of 2003. Wetland vegetation has established in the drainage outlet below the dam.

Diversion and drainage ditches are grass-covered (upgradient) and riprap-armored (down gradient and on steeper slopes). Minor amounts of vegetation occur in the riprap. The vegetation density may increase over time and should be monitored. However, as discussed above with respect to the riprap-covered tailings dam face, the vegetation density does not appear to have increased in the last few years. Grass in the vegetated portions of the drainage ditches is dense and healthy. There is no erosion.

The riprap-armored drainage channel at the northwest corner of the site property was stable and in good condition.

Area Between the Disposal Cell and the Site Perimeter

The area between the disposal cell and the site perimeter is grass-covered. This area is also grazed in a controlled manner. The grass is well established but minor erosion persists on steeper portions of the site east of the ridge that separates the northeast portion of the site property from the area containing the tailings cell (PL–3). This erosion does not threaten the integrity of the stabilized tailings.

Livestock watering tanks present on site during the 2002 inspection had been removed. There was no other evidence of livestock grazing on the site during the 2003 growing season.

Outlying Areas

The areas surrounding the Edgemont site boundary for about one-quarter mile were visually inspected at a distance from the boundary fence. The city of Edgemont operates a municipal landfill north-northwest of the site. An occasional piece of wind-blown trash from the landfill was observed on site or along the fences. Minor erosion was observed along ephemeral watercourses east of the site. Inspectors did not observe evidence of activity or change in land use that could affect the site.

Conclusion

The Edgemont disposal site is in good condition at this time. Minor fence repairs were performed by the inspectors during the inspection. Vegetation colonizing the riprap will continue to be monitored during future inspections.

Edgemont Inspection Photographs

Table 2–1. Photograph Descriptions for Edgemont, South Dakota, Disposal Site

Photograph Location Number	Description
EDG PL–1	Fence line on western property boundary.
EDG PL–2	Embankment face.
EDG PL–3	View of steep bluffs from Boundary Monument 2.

EDG 6/2003. PL–1. Fence line on western property boundary. NOTE: Correct date of photo is 06/04/2003.

EDG 6/2003. PL–2. Embankment face.

EDG 6/2003. PL–3. View of steep bluffs from Boundary Monument 2. NOTE: Correct date of photo is 06/04/2003.

3.0 Sherwood

Sherwood Site Long-Term Custody Compliance Requirements

The following list comprises the long-term custody compliance requirements for the Sherwood site as defined in Section 3.2 of the site Long-Term Surveillance Plan:

1. Annual site inspection.
2. Annual inspection report.
3. Follow-up inspections and inspection reports, as necessary.
4. Site maintenance as necessary to sustain design functions.
5. Emergency measures in the event of catastrophe.
6. Environmental monitoring as required.

The Sherwood site long-term custody compliance requirements were fulfilled for 2003 as follows:

1. The site was inspected on August 21, 2003, in accordance with the inspection procedure as outlined in Section 3.3.2 of the Long-Term Surveillance Plan (LTSP).
2. This document serves as the annual inspection report.
3. No follow-up inspections were necessary.
4. No maintenance was necessary to sustain design functions.
5. No catastrophic events necessitated emergency measures.
6. The required ground water monitoring, as specified in Section 3.7.1 of the LTSP, and the Dam Safety Inspection specified in Appendix D of the LTSP, were completed and the results are presented in this report.

Sherwood Site Inspection Results

M. K. Kastens (Chief Inspector) and M. R. Widdop (Assistant Inspector), of S.M. Stoller Corporation, the Technical Assistance Contractor at the DOE Grand Junction Office (GJO), conducted the inspection on August 21, 2003. D. Stoffel and G. Robertson, both with the Washington State Department of Health, and D. Bruce, with the U. S. Bureau of Indian Affairs, were present for portions of the inspection. N. Poritz and L. Poritz, with Biological Control of Weeds, also were on site to release a species of insect to combat the invasion of noxious weeds. The inspection was conducted in accordance with the *Long-Term Surveillance Plan* (LTSP) *for the DOE Sherwood Project (UMTRCA Title II) Reclamation Cell, Wellpinit, Washington*, (February 2001) and procedures established by DOE to comply with the requirements of Title 10 *Code of Federal Regulations* Part 40.28 (10 CFR 40.28).

The purposes of the annual inspection are to confirm the integrity of visible features at the site, to identify changes in conditions that may affect site integrity, and to determine the need, if any, for maintenance or additional inspections and monitoring.

Fourteen photographs are included in the Sherwood report. The photographs are referred to in the text of the report and on Figure 3–1 by photograph location (PL) numbers.

Access Road and Perimeter Signs

The Bureau of Indian Affairs (BIA) maintains the all-weather site access road. A double-swing steel gate controls access to the Sherwood mine area and Spokane Tribe-owned facilities near the disposal site. There is a DOE lock on the gate in addition to several other locks that are assumed to belong to the Tribe.

Six perimeter or warning signs, designated P1 through P6, are placed at likely access points around the site property. The signs are attached at a height of about 5 feet above ground to steel posts set in concrete. Perimeter sign P4, north of the site, is located on a fence line north of the actual site boundary on an old two-track road that approaches the site from the northeast. All signs are in excellent condition.

Site Marker and Boundary Monuments

One inscribed granite site marker is present on the southwest side of the site property where the access road lies closest to the site boundary. The marker is in excellent condition.

Six boundary monuments designated BM–1, BM–2, BM–3, BM–3A, BM–4, and BM–5 define the site boundary. Inspectors noted that BM–3A had been bent (PL–1); all other monuments were in excellent condition.

Monitor Wells and Piezometers

Three monitor wells are located on the Sherwood site and are designated MW–2B, MW–4, and MW–10. Monitor well MW–2B is the upgradient or background well, and wells MW–4 and MW–10 are point-of-compliance wells. The aboveground structures at the wells are in good condition.

Four piezometers, designated PZ–1 through PZ–4, were installed in November 2000 along the crest of the tailings dam as part of the Dam Safety Inspection program. The aboveground structures at the piezometers are in good condition.

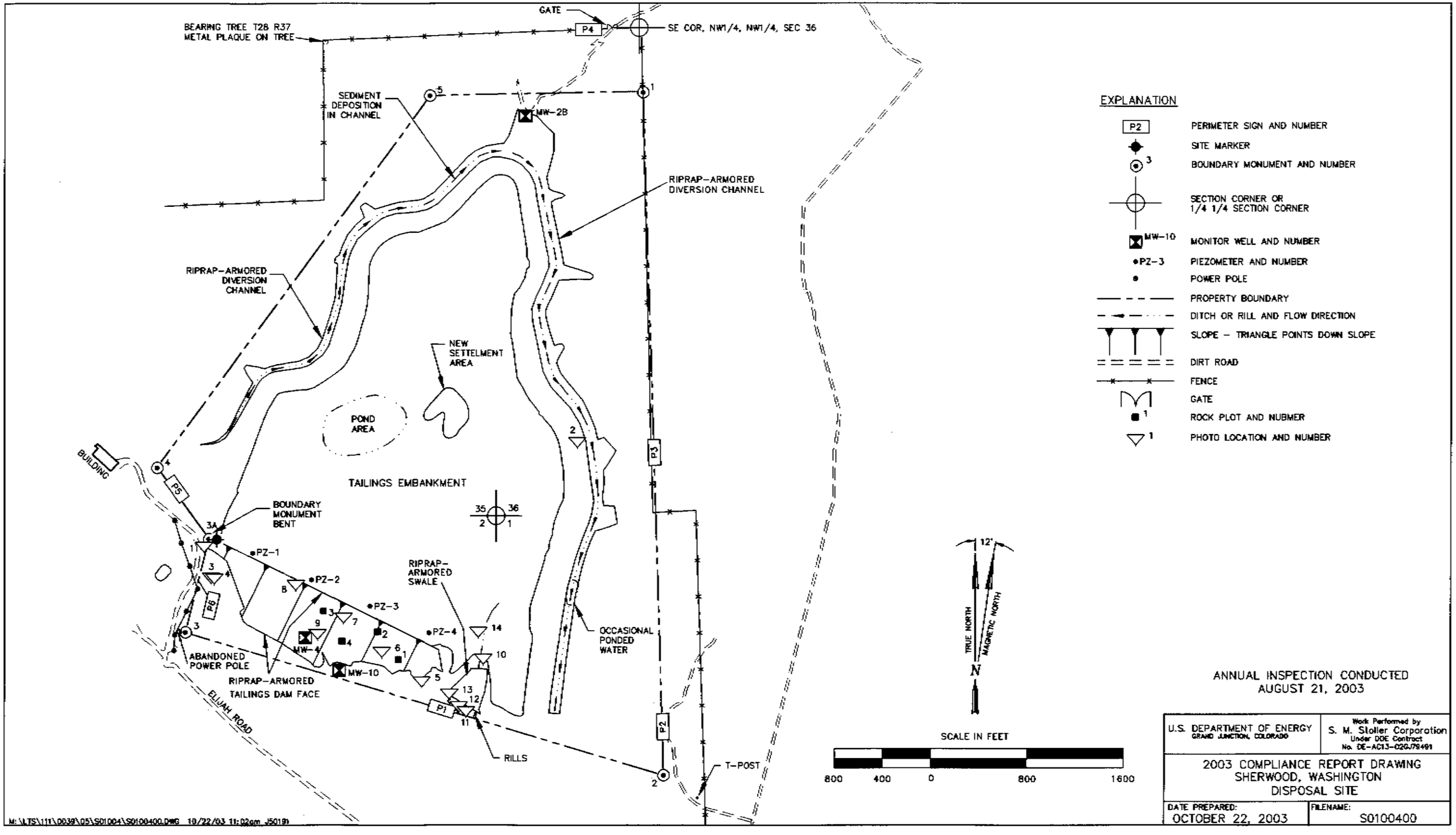


Figure 3–1. Sherwood, Washington, 2003

Tailings Impoundment Cover

The tailings impoundment cover for the Sherwood site consists of 12 to 20 feet of uncompacted soils. During site reclamation, surface soils were seeded and planted with shrubs, forbs, grasses, and trees. Reclamation has been successful, as a healthy stand of vegetation is now established.

Designers of the cell predicted that up to 10 feet of settlement could occur on the cover. Settlement has occurred over an approximate 7-acre area that has been referred to as the "pond area" and is shown on Figure 3–1. The pond area contained about 0.5 acre of standing water at the time of the inspection. The pond area was dry during the 2002 inspection. The plant species present indicate that there is year-round moisture below the surface. Vegetation in the pond area is composed primarily of native wetland species such as hardstem bulrush (*Scirpus acutus*), Olney threesquare (*Scirpus americanus*), common spikerush (*Eliocharis palustris*), sandbar willow (*Salix exigua*), and plantain (*Plantago eriopoda*). The pond provides habitat for small mammals, birds, and reptiles and appears to be a water source for larger mammals such as deer and elk, whose sign was abundant in this area.

Inspectors noted an additional settlement area east of the existing pond area (PL–2). This low-lying area, 3 to 5 acres in size, contains riparian vegetation and shows indications of having saturated soils during certain times of the year. There was no water in this settled area at the time of the inspection.

Significant populations of two noxious weed species—diffuse knapweed (*Centaurea diffusa*) and dalmation toadflax (*Linaria genistifolia*)—occur throughout and around the Sherwood site. A biological weed control program was initiated in the spring and summer of 2003 with the release of six species of insects. During the site inspection, the knapweed root weevil (*Cyphocleonus achates*) (PL–3) was being released.

Diversion Channel and Impoundment Dam Face

Inspectors walked the length of the diversion channel. Volunteer plant intrusion within the diversion channel is evident in most areas of the channel; however, because the channel is oversized, this intrusion is not expected to interfere with the channel’s design function. Rock condition is good and is the same as observed during earlier inspections. Sediment deposition is evident in places on the west side of the diversion channel, but currently does not interfere with the channel’s design function. The degree of sediment deposition should be noted during future inspections although it is not expected to increase to the degree that it could become a maintenance issue. At times, standing water has been observed in the channel along the east side of the impoundment (see Figure 3–1); this area was dry during the 2003 inspection.

The tailings embankment on this site, classified as a dam, necessitates a dam safety inspection to assure continued compliance with the Federal Dam Safety Act. The impoundment dam face was inspected in accordance with the attached Dam Inspection Checklist and photographed (PL–4 and PL–5). No evidence of seepage, slumping, erosion, or instability was observed. Ponderosa pines, some as tall as 24 inches, were observed on the face.

A small percentage of riprap has crumbled. In response to NRC concerns about rock quality, four “rock plots” were established on the embankment face to monitor the quality of riprap. The plots are intended to be approximately 1-meter square. Inspectors placed either a metal pin covered

with a sleeve of PVC pipe or a section of PVC pipe at the center of each plot and obtained location information using global positioning system equipment. Baseline photographs were taken of each plot (facing a northerly direction) (PL–6 through PL–9). Photography should be repeated during future inspections for comparison to baseline rock quality. Future inspectors may recommend changes to the plot inspection frequency or cessation of monitoring.

Adjacent to the eastern end of the dam face is a steep slope that is underlain by rock and covered with soil. Numerous rills and gullies noted during previous annual inspections were inspected on this slope (PL–10 through PL–13). No new rills were identified, and the size of existing rills had not increased since the 2001 and 2002 inspections. Although these erosional features do not threaten site integrity, they should be inspected annually to ensure the slope remains stable and sediment is not transported offsite.

A swale across the south end of the top slope is armored with riprap at the east end of the embankment, where the gradient increases. Erosion noted previously north of the riprap has cut to bedrock but considering the resistant material exposed at the invert and the low gradient of the unarmored portion of the swale, the swale appears stable (PL–14). Although additional erosion is unlikely, inspectors should monitor this area for changes.

Site Perimeter, Outlying Area, and Balance of Site

The inspectors covered the site perimeter while searching for boundary monuments and warning signs. No evidence of off site activity that could affect the integrity of the tailings impoundment was observed. Ponderosa pine forest comprises most of the surrounding area. The site property and surrounding lands are part of the Spokane Tribe of Indians Reservation. There are no residences within 0.25 mile of the site boundary.

Ground Water Monitoring and Piezometer Water Level Results

Both the required ground water sampling and the piezometer water level measurements were conducted on July 24, 2003. Ground water constituent concentrations were less than the action level (Washington water quality criteria) for confirmatory sampling. Ground water analytical results from 2001, 2002, and 2003, and piezometer water levels from 2000, 2001, 2002 and 2003 are presented in Tables 3–1 and 3–2, respectively.

Table 3–1. Ground Water Sampling and Analysis Results Summary

Constituent	Water Quality Criteria	Year	Background Well MW–2B	POC Well MW–4	POC Well MW–10
Chloride, mg/L	250	2001 2002 2003	1.460 1.790 1.330	6.290 3.100 5.260	2.350 2.630 2.190
Sulfate, mg/L	250	2001 2002 2003	3.040 3.170 3.500	27.500 20.900 27.400	25.500 27.500 28.100
TDS, mg/L	N/A	2001 2002 2003	242 258 287	445 418 432	742 715 705

mg/L = milligrams per liter

Table 3–2. Piezometer Water Levels, November 2000, July 2001, August 2002, and July 2003

Parameter	PZ–1	PZ–2	PZ–3	PZ–4
Water Level, November 2000 (initial reading at installation)	Dry	3.05 feet	Dry	Dry
Water Level, July 2001	Dry	1.95 feet	Dry	Dry
Water Level, August 2002	Dry	2.80 feet	Dry	Dry
Water Level, July 2003	Dry	3.22 feet	Dry	Dry

Conclusion

The Sherwood disposal site is in good condition at this time. No issues were identified during the dam safety inspection and no evidence of excessive settlement was observed in the pond area. The pond contained approximately 0.5 acre of water at the time of this inspection. Ground water monitoring and piezometer water level measurements conducted in July 2003 showed all measured parameters to be within acceptable ranges.

Sherwood Inspection Photographs

Table 3–3. Photograph Descriptions for Sherwood, Washington, Disposal Site

Photograph Location Number	Description
SHE PL–1	Boundary monument 3A, bent.
SHE PL–2	Additional settlement area (foreground) on top of tailings impoundment; pond area (dark green) is in background.
SHE PL–3	Knapweed root weevil.
SHE PL–4	Embankment face showing vegetation encroachment.
SHE PL–5	Embankment face showing vegetation encroachment.
SHE PL–6	Rock Plot 1.
SHE PL–7	Rock Plot 2.
SHE PL–8	Rock Plot 3.
SHE PL–9	Rock Plot 4.
SHE PL–10	Gully north of east end of embankment face.
SHE PL–11	Gully and headcut below riprap-armored portion of swale east of embankment face.
SHE PL–12	Gully below riprap-armored portion of swale east of embankment face.
SHE PL–13	Gully below riprap-armored portion of swale east of embankment face.
SHE PL–14	Swale at top of east end of embankment showing erosion to bedrock.

End of current text

SHE 8/2003. PL–1. Boundary monument 3A, bent.

SHE 8/2003. PL–2. Additional settlement area on top of tailings impoundment; pond area (dark green) is in background.

SHE 8/2003. PL–3. Knapweed root weevil (Cyphocleonus achates).

SHE 8/2003. PL–4. Embankment face showing vegetation encroachment.

SHE 8/2003. PL–5. Embankment face showing vegetation encroachment.

SHE 8/2003. PL–6. Rock Plot 1.

SHE 8/2003. PL–7. Rock Plot 2.

SHE 8/2003. PL–8. Rock Plot 3.

SHE 8/2003. PL–9. Rock Plot 4.

SHE 8/2003. PL–10. Gully north of east end of embankment face.

SHE 8/2003. PL–11. Gully and headcut below riprap-armored portion of swale east of embankment face.

SHE 8/2003. PL–12. Gully below riprap-armored portion of swale east of embankment face.

SHE 8/2003. PL–13. Gully below riprap-armored portion of swale east of embankment face.

SHE 08/2003. PL–14. Swale at top of east end of embankment showing erosion to bedrock.

End of current text

Appendix A

Sherwood, Washington, Dam Inspection Checklist

Dam Inspection Checklist

Piezometer P1 current year water elevation (feet)	dry
Piezometer P2 current year water elevation (feet)	3.22
Piezometer P3 current year water elevation (feet)	dry
Piezometer P4 current year water elevation (feet)	dry
Was evidence of significant seepage observed on the dam face? If yes discuss in report.	no
Was evidence of significant slumping observed on the dam? If yes discuss in report.	no
Was evidence of significant erosion observed on the dam? If yes discuss in report.	no
Was vegetative growth that could compromise dam stability observed? If yes discuss in report.	no, but Ponderosa pine seedlings are establishing on the dam face
Was any condition that presents imminent hazard the public health and safety or the environment observed?	no

If yes immediately contact the following:

DOE Project Manager (970) 248-6037
NRC Operations Center (301) 951-0550
Spokane Tribal Police/Sheriff (509) 258-4400

End of current text